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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/576,171	05/22/2000	Lawrence E. Myers	LWE-110	2275

7590

04/23/2003

Marek Alboszta  
Lumen Intellectual Property Services  
45 Cabot Avenue  
Suite 110  
Santa Clara, CA 95051

EXAMINER

MENEFEE, JAMES A

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/576,171

Applicant(s)

MYERS ET AL.

Examiner

James A. Menefee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Amendment***

In response to the amendment filed 10 March 2003, claims 1, 5-6, 12-14, 16-17, 19-22, 25-26, 28-29, 32-33, and 36 are amended. Claims 1-36 are pending. Previously it was indicated that the claims would be allowable if the applicant amended them as suggested by the Examiner. The claims are now being rejected in view of Knox (previously cited US 5,627,854) as a primary reference. The Examiner apologizes for any inconvenience this may have caused.

### ***Drawings***

The drawings filed on 10 March 2003 are acceptable subject to correction of the informalities indicated on the attached "Notice of Draftsperson's Patent Drawing Review," PTO-948. In order to avoid abandonment of this application, correction is required in reply to the Office action. The correction will not be held in abeyance.

## **INFORMATION ON HOW TO EFFECT DRAWING CHANGES**

### **1. Correction of Informalities -- 37 CFR 1.85**

New corrected drawings must be filed with the changes incorporated therein. Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin. If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings **MUST** be filed within the **THREE MONTH** shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

### **2. Corrections other than Informalities Noted by Draftsperson on form PTO-948.**

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All changes to the drawings, other than informalities noted by the Draftsperson, **MUST** be made in the same manner as above except that, normally, a highlighted (preferably red ink) sketch of the changes to be incorporated into the new drawings **MUST** be approved by the examiner before the application will be allowed. No changes will be permitted to be made, other than correction of informalities, unless the examiner has approved the proposed changes.

### **Timing of Corrections**

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.185(a). Failure to take corrective action within the set (or extended) period will result in **ABANDONMENT** of the application.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 12 is rejected as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted element is a saturable absorber layer. While it is mentioned in the preamble that the device is a saturable reflector, there is no saturable absorber layer in the device. Such a layer is essential for the proper operation of the device, and thus must be included.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 9-10, 22, 25-27 and 34-35 rejected under 35 U.S.C. 103(a) as being unpatentable over Knox (previously cited 5,627,854). The claimed invention is taught as follows:

Regarding claims 1-4, Knox discloses a saturable reflector apparatus comprising a substrate 14 comprising a first surface and a second surface, a reflector 12,13 deposited on the second surface of the substrate 14, the reflector including a saturable absorber layer 11. It is not disclosed that the first surface of the substrate is a modified surface, such that an etalon is formed between the reflector and said first surface of the substrate. However, it is well known, that a surface of a substrate is often a modified surface. For example, the substrate is often cleaved, polished, coated with a metal or a dielectric, or modified in any number of other ways during the basic fabrication of a device. Such a modification as mentioned above would affect this modified surface in such a manner so that an etalon would be formed between the reflector and the modified surface. It would have been obvious to one skilled in the art to modify the surface of the substrate in such a manner, because such modifications are often done to protect the substrate from impurities, achieve appropriate flatness of the substrate, or achieve a particular size of substrate, as is well known.

Regarding claim 9, Knox discloses the reflector includes a Bragg stack, making the reflector a saturable Bragg reflector.

Regarding claim 10, Knox discloses the reflector includes a metal or dielectric film.

Regarding claim 22, Knox discloses in Fig. 4 a laser comprising an optical cavity, a lasing medium 46 disposed in said optical cavity, a pump 48 that provides radiation to the lasing

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medium, and a saturable reflector 49 optically coupled to the cavity. It was shown in the above rejection of claim 1 that the saturable reflector may obviously be as claimed.

Regarding claims 25-27 and 34-35, the limitations are taught as in the rejections of claims 2-4 and 9-10 respectively above.

Claims 5-8, 11-21, 28-33, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knox in view of Weingarten et al. (previously cited US 6,393,035). Knox teaches the limitations of the claims shown above, but does not disclose the following:

Regarding claims 5-8, 16-18, and 28-31, Knox does not disclose that there are means for tuning the etalon effect, particularly a heater or cooler element with a temperature controller for adjusting the optical thickness of the substrate. Weingarten teaches a saturable reflector having portions that are temperature tuned (col. 5 lines 29-62). It is inherent that temperature tuning may be done by a heating or cooling element having a temperature controller. It would have been obvious to one skilled in the art to temperature tune the material of the saturable reflector because this allows for an optimization of the modulation depth of the device, leading to the advantages given in lines 57-62, as taught by Weingarten.

Regarding claims 11, 32-33, and 36, Knox does not disclose the thickness of the substrate. Weingarten teaches a similar saturable Bragg reflector where the substrate is 400 microns, thus falling within the claimed range (col. 12 line 61). It would have been an obvious engineering design consideration to make the substrate this thick, because the thickness of the substrate does not appear to be critical to the operation of either Knox or Weingarten, and thus using the thickness shown in Weingarten will not significantly change the operation of Knox's

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device. Therefore the substrate has a thickness large enough to act like an etalon having a free spectral range of the same order as a linewidth of the laser, i.e. 1 GHz.

Regarding claim 12, this is a method claim that is a method of tuning a saturable reflector. The reflector is taught as in the rejection of claim 1 above. Knox does not disclose that the spectrum of radiation entering the etalon of the reflector may be modified. However, as shown in the rejection of claims 5-8 and 16-18, Weingarten teaches that the etalon effect may be tuned, thus modifying the spectrum of radiation through the etalon. Motivation is the same as that shown in the rejection of claims 5-8 and 16-18 above.

Regarding claims 13-15, Knox teaches these limitations as in the rejection of claims 2-4 above.

Regarding claims 19 and 21, it is not disclosed that the tuning will adjust the values as claimed. Examiner contends that should the device be tuned, as shown to be obvious in the above claim rejections, then the values as claimed will necessarily be adjusted.

Regarding claim 20, it is not disclosed that the tuning optimizes a relationship between temporal and frequency domains. It would have been obvious to one skilled in the art to tune the device such that this relationship is optimized, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knox in view of Kortz et al. (previously cited US 5,848,079). Knox teaches the limitations of claim 22 but does not disclose the laser cavity having a nonlinear crystal, specifically the type of crystal as

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claimed. Kortz teaches a laser cavity that includes a nonlinear crystal made of lithium borate (col. 4 lines 1-24). It would have been obvious to one skilled in the art to include such a nonlinear crystal in the laser cavity because it provides frequency multiplication, as taught by Kortz, thus a lower wavelength as required by a specific application may be attained.

### ***Response to Arguments***

Applicant made no arguments as the amendments were done to comply with the Examiner's suggestion that the claims would be allowable.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sawano et al. (US 5,933,442) teaches a substrate that is polished so that the substrate achieves a desired thickness. Sumida (US 5,303,256) teaches a substrate that has a dielectric coating disposed thereon.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (703) 605-4367. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.



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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



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JM

April 18, 2003